

PROJECT

## UMRIDA

# Uncertainty Management for Robust Industrial Design in Aeronautics

**Funding:** European (7th RTD Framework Programme)

**Duration:** Oct 2013 - Sep 2016

**Status:** Complete

**Total project cost:** €5,730,351

**EU contribution:** €3,899,892



**Call for proposal:** FP7-AAT-2013-RTD-1

[CORDIS RCN : 110517](#)

### Objectives:

Virtual prototyping (VP) is a key technology for environmentally friendly and cost effective design in the aircraft industry. However, the underlying analysis and simulation tools (for loads, stresses, emissions, noise), are currently applied with a unique set of input data and model variables, although realistic operating conditions are a superposition of numerous uncertainties under which the industrial products operate (uncertainties on operational conditions, on geometries resulting from manufacturing tolerances, numerical error sources and uncertain physical model parameters). Major new developments in this new scientific area of Uncertainty Management and Quantification (UM and UQ) and Robust Design methods (RDM) are needed to bridge the gap towards industrial readiness, as the treatment of uncertainties enables a rigorous management of performance engagements and associated risks. This is the main objective of the UMRIDA project, which has the following action lines:

- Address major challenges in UQ and RDM to develop and apply new methods able to handle large numbers of simultaneous uncertainties, generalised geometrical uncertainties in design and analysis within a turn-around time acceptable for industrial readiness in VP systems.
- To respond to the validation requirements of UQ and RDM, a new generation of database, formed by industrial challenges (provided by the industrial partners), and more basic test cases, with prescribed uncertainties, is proposed.
- The methods developed will be assessed quantitatively towards the industrial objectives on this database, during the project and at two open workshops. The gained experience will be assembled in a Best Practice Guide on UQ and RDM.

It is anticipated that the UMRIDA project will have a major impact on most of the EU objectives for air transport, by enabling design methods to take into account uncertainty based risk analysis.

### Parent Programmes:

[FP7-TRANSPORT - Transport \(Including Aeronautics\) - Horizontal activities for implementation of the transport programme \(TPT\)](#)

**Institute type:** Public institution

**Institute name:** The European Commission

**Funding type:** Public (EU)

### Lead Organisation:

**Numerical Mechanics Application International**

**Address:**

5 Avenue Franklin Roosevelt  
1050 BRUSSELS  
Belgium

**Organisation Website:**  
<http://www.numeca.com>

**EU Contribution:** €590,000

## Partner Organisations:

### Institut National De Recherche En Informatique Et Automatique

**Address:**  
Domaine de Voluceau- Rocquencourt  
B.P. 105 LE CHESNAY  
France

**Organisation Website:**  
<http://www.inria.fr/>

**EU Contribution:** €229,000

### Esteco Spa

**Address:**  
Localita Padriciano 99  
34012 Trieste  
Italy

**EU Contribution:** €125,000

### Linkoepings Universitet

**Address:**  
Hus Origo Campus Valla  
581 83 LINKOEPING  
Sweden

**Organisation Website:**  
<http://www.liu.se>

**EU Contribution:** €200,000

### Vrije Universiteit Brussel

**Address:**  
Pleinlaan  
1050 Brussel  
Belgium

**Organisation Website:**  
<http://www.vub.ac.be>

**EU Contribution:** €175,000

### Safran Helicopter Engines

**Address:**  
Avenue Du President Szydlowski  
64510 Bordes  
France

**EU Contribution:** €26,000

**Man Diesel & Turbo Schweiz Ag****Address:**

Hardstrasse 319  
8005 Zurich  
Switzerland

**EU Contribution:** €118,000

**Ecole Polytechnique Fédérale De Lausanne****Address:**

Batiment Ce 3316 Station 1  
1015 LAUSANNE  
Switzerland

**Organisation Website:**

<http://www.epfl.ch>

**EU Contribution:** €194,999

**Office National D' Etudes Et De Recherches Aéropatiales****Address:**

29, avenue de la Division Leclerc  
BP72 CHÂTILLON CEDEX  
France

**Organisation Website:**

<http://www.onera.fr>

**EU Contribution:** €245,000

**Deutsches Zentrum Fr Luft Und Raumfahrt E.v****Address:**

Linder Hoehe  
51147 KOELN  
Germany

**Organisation Website:**

<http://www.dlr.de>

**EU Contribution:** €229,940

**Airbus****Address:**

2 ROND POINT EMILE DEWOITINE  
31700 BLAGNAC  
France

**Organisation Website:**

<http://www.airbus.com>

**EU Contribution:** €179,986

**Easn Technology Innovation Services Bvba****Address:**

Terweidenstraat 28  
3440 Budingen  
Belgium

**EU Contribution:** €50,000

**Centre Europeen De Recherche Et De Formation Avancee En Calcul Scientifique**

**Address:**

Avenue Gaspard Coriolis 42  
31057 Toulouse  
France

**Organisation Website:**

<http://www.cerfacs.fr>

**EU Contribution:** €115,020

**Politechnika Warszawska**

**Address:**

Plac Politechniki 1  
00 661 Warszawa  
Poland

**Organisation Website:**

<http://www.pw.edu.pl>

**EU Contribution:** €139,960

**Dassault Aviation**

**Address:**

9, Rond-Point des Champs-Élysées - Marcel Dassault  
75008 PARIS  
France

**Organisation Website:**

<http://www.dassault-aviation.com>

**EU Contribution:** €134,000

**Npo Saturn Oao**

**Address:**

Ulica Lenina 163  
Rybinsk Yaroslav Region  
152903  
Russia

**EU Contribution:** €118,000

**Centro Italiano Ricerche Aerospaziali Scpa**

**Address:**

Via Maiorise s/n  
81043 CAPUA (CE)  
Italy

**Organisation Website:**

<http://www.cira.it>

**EU Contribution:** €180,000

**Alenia Aermacchi Spa**

**Address:**

Viale Dell'aeronautica Snc  
80038 Pomigliano D'arco (Na)  
Italy

**Organisation Website:**  
<http://www.aermacchi.it>

**EU Contribution:** €171,865

### **Centre Internacional De Metodes Numeric En Enginyeria**

**Address:**  
C Gran Capitan, Edifici C1, Campus Nord Upc Sn  
8034 Barcelona  
Spain

**Organisation Website:**  
<http://www.cimne.com>

**EU Contribution:** €130,000

### **Leonardo - Societa Per Azioni**

**Address:**  
Piazza Monte Grappa 4  
195 Roma  
Italy

**EU Contribution:** €168,127

### **Technische Universiteit Delft**

**Address:**  
. .  
2600 GA Delft  
Netherlands

**EU Contribution:** €190,000

### **Technische Universitaet Dresden**

**Address:**  
Helmholtzstrasse 10  
1069 Dresden  
Germany

**Organisation Website:**  
<http://www.tu-dresden.de/>

**EU Contribution:** €189,996

### **Technologies:**

Computer-aided design and engineering  
Virtual Prototyping

**Development phase:** Research/Invention

**STRIA Roadmaps:** Vehicle design and manufacturing

**Transport mode:** Air transport

**Transport sectors:** Passenger transport, Freight transport

**Transport policies:** Decarbonisation, Environmental/Emissions aspects

**Geo-spatial type:** Other

